

## 1.00 (25.4 mm) Caliber Gun



### Target Capabilities

- Hazardous and nonhazardous targets
- Target tank can withstand a 2.3 kg TNT equivalent pressure release
- Target chamber: 9 ft diameter x 30 ft long

### Single Projectile Sizes

0.4 mm – 25.4 mm  
(0.0157 in. – 1.00 in.)

### Velocity Range

1.5 km/s – 7.0 km/s

### Diagnostics Available

- Projectile Verification
- 6 Flash X-ray Heads
  - Ultra High-Speed Digital Imaging System

### Velocity Measurement

- 4 Laser Intervalometers
- 3 Photodiode Flash Detectors
- Ultra High-Speed Imaging System

### Other

- Digital X-ray Film Scanner
- 8-Channel PXI-based 100 MHz Data Acquisition System
- Accelerometers, Acoustic Emission Systems
- Ability to pressurize and/or heat/cool targets

## .50 (12.7 mm) Caliber Gun



### Target Capabilities

- Target chamber: 5 ft diameter x 8 ft long

### Single Projectile Sizes

0.4 mm – 11 mm  
(0.0157 in. – 0.4331 in.)

### Velocity Range

1.5 km/s – 7.0 km/s

### Diagnostics Available

- Projectile Verification
- 3 Flash X-ray Heads
  - Ultra High-Speed Digital Imaging System
  - Cordin Ultra High-Speed Shadowgraph Camera

### Velocity Measurement

- Laser Intervalometers
- 3 Photodiode Flash Detectors
- Cordin Camera
- Ultra High-Speed Imaging System

### Other

- Digital X-ray Film Scanner
- 8-Channel PXI-based 100 MHz Data Acquisition System
- Accelerometers, Acoustic Emission Systems
- Ability to pressurize and/or heat/cool targets

## .17 (4.32 mm) Caliber Gun



### Target Capabilities

- Target chamber: 3.5 ft diameter x 7 ft long

### Single Projectile Sizes

0.05 mm – 3.6 mm  
(0.002 in. – 0.142 in.)

### Velocity Range

1.5 km/s – 8.5 km/s

### Diagnostics Available

- Projectile Verification
- Ultra High-Speed Digital Imaging System

### Velocity Measurement

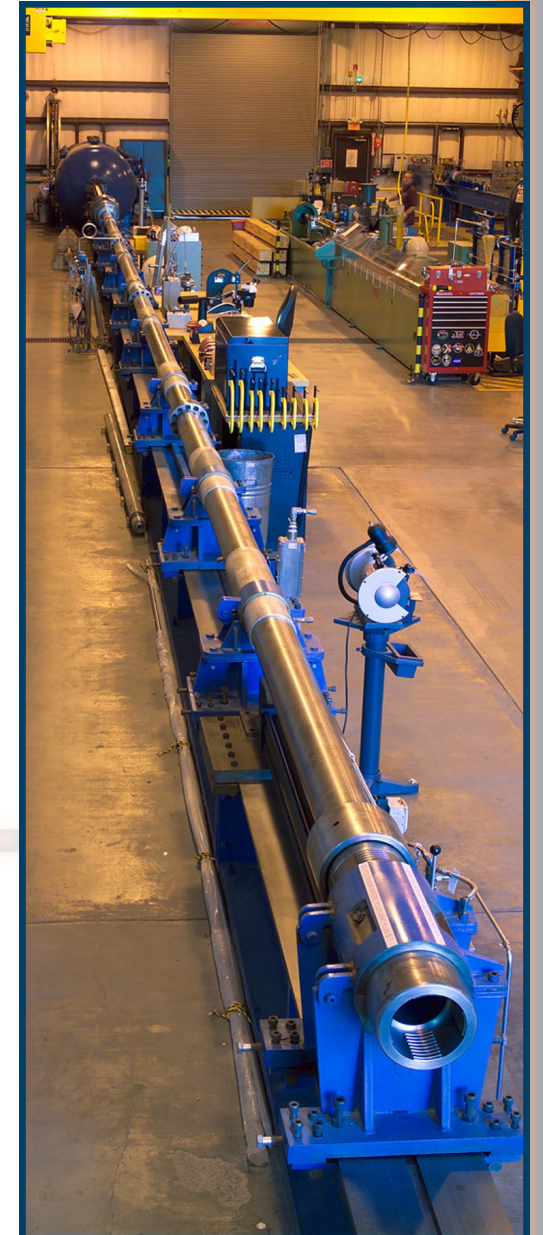
- 3 Laser Intervalometers
- 3 Photodiode Flash Detectors
- Ultra High-Speed Imaging System

### Other

- 8-Channel PXI-based 100 MHz Data Acquisition System
- Accelerometers, Acoustic Emission Systems
- Ability to pressurize and/or heat/cool

## Mission Statement

Provide the infrastructure to safely and cost effectively perform hypervelocity impact testing on spacecraft components, assemblies, and hazardous materials utilizing professionalism, expertise, and a commitment to customer satisfaction.





## Remote Hypervelocity Test Laboratory

The White Sands Test Facility (WSTF) Hazardous Remote Hypervelocity Test Laboratory (RHTL) is an isolated, access-controlled test area capable of simulating micrometeoroid and orbital debris impacts on spacecraft materials and components, satellites, and material research. The facility was designed to safely handle and test hazardous targets, making it unique within NASA. Targets can be pressurized or electrically energized when requested. A site-wide hazardous fluid handling and disposal network allows toxic and explosive targets to be safely evaluated. Release energies up to 2.3 kg (5 lb) TNT equivalent can be accommodated within the facility's sealed target chambers.

The Hypervelocity Test Team has consistently performed over 400 shots per year with three two-stage light gas guns. These launchers propel single

0.05 mm to 25.4 mm (.002 to 1.00 in.) diameter projectiles to velocities in excess of 8.5 km/s (27,900 ft/s). Projectile shapes range from spheres, cylinders, disks, and cubes to multiple projectile "shotgun" shots. The Hypervelocity team will perform the necessary gun performance analysis and pretest validation shots to ensure the requested projectile velocities are within  $\pm 0.20$  km/s. Because of WSTF's remote location and attention to safety, the RHTL is capable of implementing test programs that propel projectiles at toxic or explosive materials and components such as batteries, aerospace fluids, and pressurized containers in a controlled laboratory environment.

All testing is performed within the NASA Calibration and Quality Assurance programs to provide top quality data to our customers. The Measurement Standards and Calibration Laboratory at WSTF ensure measurements are accurate by calibrating to standards traceable to the National Institute of Standards and Technology (NIST). The lab is certified to meet the ISO 9001 Standard and is compliant with AS 9100.



## Contact

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[www.nasa.gov/centers/wstf/home/index.html](http://www.nasa.gov/centers/wstf/home/index.html)

# Hypervelocity Impact Testing



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